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The Mathematics in a Dramatic Text – *A Disappearing Number* by Complicite

Abstract: *A Disappearing Number* gives vent to Simon McBurney's fascination with science, in this case with mathematics. The story of the mathematician Srinivasa Ramanujan constituted the groundwork for the collective theatrical production whose literary "translation" was published by Oberon Books in 2007. This article investigates the ways in which the text de-automatises dramatic conventions. On the one hand, the text, as a literary record of the theatrical production, seems to be an intersemiotic translation of the "original," which suggests its secondary, derivative character, but, on the other hand, because of its status as a dramatic text, *A Disappearing Number* enters the sphere of literature which is intrinsically subordinated to the powers of imagination. In this way, it is argued, Complicite associates mathematics with art (literature): these are the spheres where imagination is of the greatest importance. This is made explicitly apparent in the characters' utterances and in various textual strategies. *A Disappearing Number* begins, for example, with an explanation of a mathematical concept provided by Ruth, a lecturer, in a "university lecture hall." The explanation is followed by a strictly meta-theatrical greeting of the audience. The illusion of the stage is emphasised as much as the immutable nature of mathematical reality at this point. The function of mathematics is not restricted to the thematic dimension of the play; mathematical principles are also decisive for the construction of the model of the world. Simultaneity of action, for instance, reflects the complicated nature of certain equations, the Great War is associated with the number of its victims, Ramanujan's death is shown on stage through a metaphorical subtraction and the passing of the number zero, and even the title suggests some equivalence between a number and a life of a human being.

1

An expression of some aesthetic presumptions of the Théâtre de Complicité may be found on the title page of their book entitled simply *Complicite: Plays 1*:

Founded in 1983, Complicite is a constantly evolving ensemble of performers and collaborators, now led by Artistic Director Simon McBurney. Complicite's work has ranged from entirely devised work to theatrical adaptations and revivals of classic texts. . . . Always changing and moving forward to incorporate new stimuli, the principles of the work have remained close to the original impulses: seeking what is most alive, integrating text, music, image and action to create surprising, disruptive theatre.

It is true that since 1991 Complicite have produced such diverse performances as *The Street of Crocodiles* (a multi-lingual performance based on Bruno Schultz's short stories, letters and essays), *The Three Lives of Lucie Cabrol* (Brechtian in character, based on a story by John Berger), *Mnemonic* (in this case the semiosphere of the stage mixes together an archeological investigation of a Neolithic body found in the Italian Alps, the theory of fractals, the conventions of a radio-play, and striking allusions to literary works – the name of the protagonist is Virgil). Then, in 2003, Complicite's enduring fascination with crossing the boundaries of individual codes, languages included, resulted in the co-operation with Tokyo's Setagaya public theatre and in the production of *The Elephant Vanishes*, a multi-media performance in Japanese based on short stories by Haruki Murakami. Spectacular as it was, the visual dimension of *The Elephant Vanishes* may be best illustrated by the powerful theatrical creation of an on-stage elephant: it was brought to life by a visual synecdoche of an elephant's eye shown on a portable TV screen which was tenderly caressed by one of the actors.¹

Notwithstanding the highly selective character of the above examples, I have decided to use them in order to reveal the most subversive tendency in the work of Complicite. By adapting the whole spectrum of various aesthetic principles (the minimalist *Shun Kin*, yet another performance in Japanese, as opposed to the exuberant *The Elephant Vanishes*), by shifting between languages, literatures and cultures (British, Jewish, European, Polish, Japanese and other), by transgressing – or should I say ignoring? – the boundaries of particular media,² Complicite persistently de-automatise their own achievements and go against the conventions that were previously functional in their artistic creations. It is disturbing that all those “post-dramatic” performances, based on short-stories, essays and other narratives, were followed by a production of Samuel Beckett's *Endgame*, one of those twentieth-century classics that thrive on the literary provenance of a theatrical performance.³

2

A Disappearing Number was first produced in 2007. It followed the 2005 revival of *Measure for Measure* and preceded the premiere production of *Shunkin*. The performance was subsequently revived in 2008 and 2010. It is

¹ For more data on theatrical productions of Complicite and photographic documentation of the performances discussed here, see the company's website: www.complicite.org.

² Functionality of media in theatre is discussed, for example, in Limon and Żukowska.

³ It is worth stressing that despite an earlier tendency to adapt texts for the contemporary stage (see *Measure for Measure*), Complicite obeyed the majority of restrictions imposed by the dramatic text in the production of *Endgame*.

noteworthy that, following the pattern established by *Light, The Street of Crocodiles, The Three Lives of Lucie Cabrol* and *Mnemonic*, *A Disappearing Number* was published as a dramatic text and we can speak here of an intersemiotic translation from “stage” to “page.” Deprived of its visual and aural dimensions (hence of its spoken live character), the semiosphere of a theatrical performance found its literary counterpart in the dramatic structures of a text. Thus, *A Disappearing Number* became “a literary fact.” This was accomplished in the way parallel to the one described by Jurij Tynianow: in short, non-literary – in this case theatrical – structures transgress literary norms so as to reformulate the constructional principles of literature. In this way – to use Dobrochna Ratajczakowa’s terms (36–42) – the work of Complicite goes beyond the interests of theatrology and enters the sphere of dramatology (which is good news for self-declared orthodox dramatologists like the present author).

One more theoretical issue demands clarification before I embark on a more detailed analysis of *A Disappearing Number*. There are profound consequences for my application of the term “intersemiotic translation” in reference to an intriguing transformation of a theatrical performance into a dramatic text. Used in the sense proposed by George Steiner, an act of translation is understood here as a hermeneutic process which consists of four sequential stages: 1. axiological trust, 2. an invasion, 3. a proper translation, and 4. restitution – “The just translator . . . will seek for equity in the hermeneutic exchange so as to compensate for the ‘adulteration and *déperdition*’ . . . caused by all *translatio*” (8). When translated into a dramatic text, *A Disappearing Number* not only acquires the permanence of the written, but also exploits the semantic and aesthetic potential of the literary mode of communication (we all know, of course, that conventionally the process goes the other way round: a theatrical concretisation of a dramatic text “enlivens” the written by putting literature into a theatrical context). What is crucial for me, however, is the notion of compensation, restitution: when deprived of the visual and the aural, *A Disappearing Number* explores the literary potential of the language and thrives on its poetic value.

3

The subversive force of *A Disappearing Number* is strengthened by yet one more aspect. After all, the origins of the performance are to be sought in a book. But this time, it is neither a dramatic text (as in *Measure for Measure* or *Endgame*) nor even a prose narrative (as in *The Street of Crocodiles, The Elephant Vanishes* or *Shun-kin*). The book whose plot stimulated the theatrical creation of *A Disappearing Number* was *A Mathematician’s Apology*, published

in 1940 and written by a Cambridge mathematician, G. H. Hardy. It describes the short career of an Indian mathematical genius, Srinivasa Ramanujan. We may say that selected passages of the memoirs fulfilled functions which, in more conventional circumstances, are ascribed to the text of a play. This sophisticated and extensive semiotic process endowed *A Mathematician's Apology* with the codex function, and, in turn, imposed mathematics upon the supercode of a dramatic text. The remaining part of this paper presents my attempts at proving the relevance of the thesis formulated in the previous sentence. From now on, I will concentrate entirely on *A Disappearing Number* in its dramatic, i.e., literary, shape, and therefore all questions of a strictly theatrical character cease to be valid. In other words, I will understand terms such as “theatre,” “stage” and “audience” as abstract concepts generated by the dramatic text and active within its semiosphere (Lotman 123). In this way, then, we have transgressed into the sphere of the literary imagination.

4

A Disappearing Number consists of fifteen compositional segments. Even though the word does not appear in the text, they function as scenes and I will refer to them as such. So, first, numbers govern the composition (segmentation), but this is true also for other aspects of the text. The majority of characters are either professional or amateur mathematicians. On the one hand, we have the world-famous Hardy and Ramanujan, a university lecturer represented by Ruth, and a scholar, Aninda (he is, in fact, a physicist who creatively employs Ramanujan's concepts). On the other hand, there is Al, who in his professional life of a features market manager involuntarily uses mathematics (as I shall illustrate later, Al falls in love with Ruth because of mathematics). More striking, though, and definitively more spectacular, is the example of an Indian cleaner who, after emptying a waste-paper bin and performing other cleaning duties, without any serious effort corrects the mistake in the functional equation of the Riemann zeta function which is written on the whiteboard of the university lecture hall.

The characters use numbers when speaking of time (“ANINDA. At about ten o'clock on the morning of March 17, 1914, the SS Nevasa slipped slowly away from the dock”; 54), travelling in space (“RAMANUJAN. Madras is at the latitude of 13 degrees north, a prime number. The ship travels south to the latitude of 7 degrees north, also a prime number”; 55), and communicating with others – the convention of the phone conversation may serve as an example. The following situation is placed immediately after Ruth's academic lecture in scene two when Al and Ruth get to know each other:

AL. Wait! There is one particular number that I am, in fact, interested in.

RUTH. Yes? *Pause.*

AL. It's your phone number. *Pause. Ruth smiles.*

RUTH. I've never been asked that before. After a lecture, I mean...

AL. You're blushing.

RUTH. You're blushing.

AL. See where the Riemann Zeta Function gets you. (28–29)

As we can see in this episode, it is the incomprehensibility of a particular mathematical equation which gets Al's attention. He becomes attracted to Ruth because of her scholarly power to understand issues that remain incomprehensible to him: a trivial beginning of a love affair is motivated by rather unconventional sophistication.

The motif of a phone number frequently becomes multifunctional in *A Disappearing Number*. The number the characters discussed in scene two reappears in scene four when Ruth leaves a message on Al's answer-machine:

RUTH. Al, it's Ruth, Ruth Minnen. You're probably in Geneva by now... I just wanted to say thank you for the other night. I had a really lovely time. I probably didn't manage to assuage your worries about infinity. But have a successful trip and do call any time, next time you're in London. Bye. Oh! My number: 0207 291 1729. Bye. (36)

By revealing her phone number to Al, Ruth reveals her intention to continue the affair and the number becomes a part of her emotional expression.

Not surprisingly, in the world of mathematicians, numbers, all sorts of numbers, are endowed with semantics. The telephone number mentioned by Ruth is no exception to this rule. One aspect of the on-stage action – one of its humorous sub-plots – presents strenuous, if funny, attempts by Al to transfer the number to his phone (there are some curious elements of the convention of the comedy of errors in his numerous phone conversations with a Barbara Jones from BT headquarters). The intimate associations of 0207 291 1729 are clear once we become aware of the fact that Ruth, who at one stage became Al's wife, died when searching for traces of Ramanujan in India. The four final figures of the phone number, 1729, play, moreover, a significant role in the development of their relationship. The audience's curiosity concerning the meaning of the number is only satisfied as late as in scene thirteen when one of the final meetings of Hardy and Ramanujan is presented:

HARDY. The number of my taxi-cab was 1729. It seemed to me rather a dull number.

RUTH writes 1729 on the OHP. RAMANUJAN looks at Hardy and then speaks live for the first time:

RAMANUJAN. No, Hardy, 1729 is a very interesting number. It is the smallest number expressible as the sum of two cubes in two different ways. *Pause.*

ANINDA. That was the exchange as Hardy recorded it and it must be substantially accurate. He was the most honest of men and, besides, who could possibly have invented it? (79)

The four final figures of the telephone number echo an episode from *A Mathematician's Apology*. But for Al and Ruth the number is also a bone of contention since it reveals the discrepancy in their mathematical knowledge: Ruth knows more than Al and she wants him to follow her way of reasoning. This is another useful quotation taken from scene thirteen:

RUTH. (*Looks at [Al].*) What's the significance of my phone number?

AL. What?

RUTH. (*Angry*) You see, you don't understand because you haven't even read this fucking book yet! *She pushes the copy of A Mathematician's Apology towards him, furious.* (80)

Intertextual connections have been firmly established: the text of *A Disappearing Number* provokes the reader/audience to become familiar with Ramanujan's story as related by G. H. Hardy.

5

A Disappearing Number consolidates equivalence of mathematics and art. Both are shaped as spheres dominated by the powers of the creative imagination. Constantly reinforced on various textual levels, this equivalence formulates a field of associations in which superiority of mathematics is unquestionable. The performance begins with Ruth's explanation of certain mathematical concepts:

RUTH enters. She writes '1, 2, 3, 4, 5' on the whiteboard.

RUTH. (*Nervous*) Good evening ladies and gentleman. I'd like to go through one or two very basic mathematical ideas that are integral to this evening so that the recurrent mathematical themes become clear to you. (21)

Her academic monologue, which takes the shape of a lecture delivered in a "university lecture hall," is followed by a strictly meta-theatrical address that Aninda directs to the audience:

RUTH continues to lecture, oblivious, as ANINDA addresses the audience.

ANINDA. (*In an Indian accent.*) You're probably wondering at this point if this is the entire show. I'm Aninda, this is Al and this is Ruth. (*Pause. His accent changes.*) Actually, that's a lie. I'm an actor playing Aninda, he's an actor playing Al and she's an actress playing Ruth. But the mathematics is real. It's terrifying, but it's real. (23)

Here and in subsequent passages of Aninda's monologue, deictic indicators contribute to the formation of both the fictional world and the model of the theatre. The reader is forced to take the perspective of the audience who is aware of its theatrical status and simultaneously taken in by the theatrical illusion.

The equivalence of the mathematical and the meta-theatrical is further strengthened in the passage which employs a trivial, yet, in the theatrical context, challenging, mathematical trick:

ANINDA. (*He looks out at the audience.*) They say mathematics is not a spectator sport, so please think of a number. Don't tell anyone, this is your own personal, secret, number. We will call this number 'n'. Unless you are like Daniel Tammet and can remember pi to twenty-two thousand decimal places, please choose a simple number. . . . Now multiply that number by two. . . . Now add fourteen. (*He points into the auditorium.*) Someone is already with their head in their hands – obviously choosing a negative number has repercussions. Now divide this new number in two. . . . Finally, take away your original number. (*Pause.*) And what I like about the theatre is that we are all able to imagine the same thing at the same time, just as now, we are all imagining the number seven. (25)

In the above passage, Aninda de-automatises the convention of a temporal discrepancy between the stage and the audience. By suggesting a spatio-temporal unity between the two, the fragment seems to challenge Limon's concept of time in theatre (5–8). Yet, it is, of course, the codex which – by individualising theatrical reception – imposes textual meanings upon the model of the theatre.

Both the illusion of the stage and the fictionality of the world it creates are emphasised as much as the immutable nature of mathematical reality. Towards the end of the play, in scene fourteen, the semantics of the juxtaposition is made even more specific. The appropriate passage is, not surprisingly, uttered by Ruth:

(*Voice-over.*) For me, and I suppose for most mathematicians, there is another reality, which I shall call mathematical reality. (*Pause.*) Take a chair for example. A chair may be simply a collection of whirling electrons, or an idea in the mind of God; the more we think of it, the fuzzier its outlines become in a haze of sensation which surrounds it. (*Pause.*) But the number 2 or 317 has nothing to do with sensation. 317 is a prime number, not because we think so, or because our minds are shaped in one way rather than another, but because it is so, because mathematical reality is built that way...
The music climaxes and the chair explodes. (82)

The visual and the spoken intertwine. Faced with the immutability of the primes, the on-stage dematerialisation of a chair, one of favourite props of Complicite, proves what is, and what is not, real on the stage.

6

In the concluding part of this article, I wish to enumerate some possible directions for further discussion.

6.1

Numbers actively participate in the creation of visual and aural metaphors in *A Disappearing Number*. On the one hand, they contribute to the implications of the semantic noise, which is particularly striking when numbers dominate the stage in the way they do in one of the final episodes in scene four:

BARBARA. (*Voice over.*) Mr Cooper, can I take your telephone number again please?
 AL. It's 0207...
 BARBARA. (*Voice over.*) 0...2...0...7...
 ANINDA. (*Into phone.*) 00...41...for Switzerland, Auntie...
And they are all speaking simultaneously. A chaotic jumble of numbers. (37)

Numbers contribute here to the impression of chaos. On the other hand, numbers broaden sequences of equivalence and thus enliven the functionality of fields of associations. This is the case in scenes ten and twelve where stage directions, when mixed with utterances, establish the paradigmatic equivalence between numbers, snow and winter; between zero, miscarriage and death; and between a mathematical equation and the victims of the First World War:

RUTH. (*Voice-over.*) 2 cubed times 3 squared times 5 times 7 times 11 times 13 times 97 equals 34,954,920. . . . 34,954,920. The number of dead, wounded and missing in the First World War. (73–74)

In this powerful passage, what initially seems a mere number turns out, once again, to convey unexpected meaning (the same method of meaning creation is applied, as we remember, to the number of Ruth's telephone).

6.2

In *A Disappearing Number* mathematics is firmly associated with art. Their juxtaposition becomes a central theme in the passage of *A Mathematician's Apology*, which is read by Ruth in scene five:

A mathematician, like a painter or a poet is a maker of patterns. . . . A painter makes patterns with shapes and colours, a poet with words. . . . A mathematician on the other hand has nothing to work with but ideas, and so his patterns are likely to last longer, since ideas wear less with time than words. . . .
 HARDY. (*Voice-over.*) The mathematician's patterns, like the painter's or the poet's must be beautiful; the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test: there is no permanent place in the world for ugly mathematics. (41)

In this context, it is very important that, similarly to poetry, the beauty of mathematics lies in what is beyond comprehension. We remember that this incomprehension was the main reason of Al's fascination with Ruth:

RUTH. (*Voice-over.*) It may be hard to define mathematical beauty but that is true of beauty of any kind. We may not know quite what we mean by a beautiful poem, but that does not prevent us from recognising one when we read it. (42)

6.3

Abstract as they are, mathematical patterns contribute to the creation of a model of the world in *A Disappearing Number*. This process is metaphorically described in the following stage direction in scene ten: "*The mathematics from the small blackboard slowly grows until it fills the entire stage*" (62). Mathematical (geometrical) patterns govern the distribution of actors on the stage in certain episodes. They are employed so as to describe the pace of the characters' lives (death is expressed either as "zero" or as moving away towards infinity) and to convey spatio-temporal concepts (e.g., dates and latitudes). Finally, we should not forget that even the title suggests some equivalence between a number and a life of a human being: we are as numbers that disappear in an infinity.

6.4

In *A Disappearing Number*, it soon becomes clear that the abstract world of mathematics affects what is happening around people in a most tangible way. The characters are aware that mathematics may be used as a dangerous tool and for brutal purposes. In scene twelve, for example, Hardy suggests the dangers of mathematics in the following utterance:

HARDY. We have still to ask whether mathematics does harm. . . . I believe that pure mathematics has no effects on war; the real mathematician has his conscience clear. . . . The trivial mathematics on the other hand has many implications in war. . . . The gunnery experts and aeroplane designers could not do their work without it. . . . Mathematics facilitates modern, scientific, total war. (72–73)

Hardy's idealistic distinction of "pure" and "trivial" mathematics puts forward all the moral anxiety of modern science: what can be done with the results of even most abstract investigations is never under control of the investigator.

6.5

The model of the world which emerges from *A Disappearing Number* promotes the impassable barrier between mathematical reality and the way in which it is described. There is a belief that “real” mathematics substantially differs from what is achieved in its description. In this way, *Complicite* join a well-established dramatic tradition of artistic explorations of the semiotic discrepancy between the phenomenal world and semiotic reality: there is no ontological link between a signifier and a signified. *A Disappearing Number* echoes, in this sense, the work of a whole group of twentieth-century classics: John Millington Synge, Samuel Beckett and, of course, Tom Stoppard.

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